Beringian Research Notes

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Sketch by Craig Cameron

Jefferson's Ground Sloth

This ground sloth (*Megalonyx jeffersonii)* is one of the most unusual North American Ice Age mammals. Its bones are so peculiar that whenever I encounter an "unrecognizable" large mammal bone in the Old Crow Basin of the northern Yukon, *Megalonyx* is the first animal I consider. This long-haired, ox-sized animal was one of several, including the American mastodon (*Mammut americanum*), the giant short-faced bear (*Arctodus simus*) and the flat-headed peccary (*Platygonus compressus*), to enter the Yukon and Alaska from southern North America: the main mammalian invasion of Canada came from Eurasia via the "Bering Isthumus".

This species is of historical as well as paleontological significance, for Thomas Jefferson's lecture on *Megalonyx* ("great claw") to the American Philosophical Society in 1797 marked the beginning of vertebrate paleontology in North America. Appropriately, *Megalonyx jeffersonii* was named for the third president of the United States.

Jefferson's ground sloth, the largest known species of *Megalonyx*, when fully grown was about the size of an ox (2.5 to 3.0 m long). The more southerly specimens are smaller than those from the north: such latitudinal clines are seen in many living mammals. The skull is short, broad and deep with a blunt muzzle (Figure 1). Evidently chewing muscles were well-developed, and the deep, heavy mandible lacks the spout-like front characteristic of megathere ground sloths (Megatheriidae).

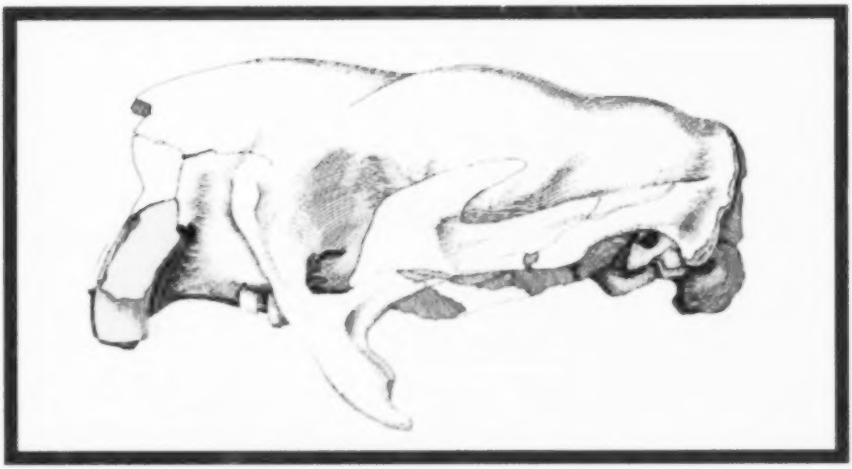

Figure 1: Left Side View of Cranium (Ink drawing by Erica Hansen)

Normally there are five teeth on each side of the upper jaw and four on each side of the lower jaw. The teeth are peg-like (Figure 2) and a space (diastema) separates the blunt, broad, ovate caniniforms (fang-like teeth) from the wider cheek teeth. As in living tree sloths of South and Central America (e.g., *Bradypus tridactylus*), milk teeth are absent. Compared to other ground sloths, Jefferson's has broad, wing-like processes on the heel bone (calcaneum), and a short third upper foot bone (metatarsal), and v-shaped fifth metatarsal and an outward-bowed fibula. *Megalonyx* and other ground sloths had well-developed collar bones (clavicles) and sternal ribs.

Megalonyx jeffersonii, like humans, had plantigrade hind feet, the weight being borne on the sole rather than the outside of the foot as in other ground sloths. Further, the three central claws of the hind foot were well developed and touched the ground, presumably allowing these animals to move more easily and with greater stability than other ground sloths. Could that feature, perhaps with greater cold tolerance

(unusually thick hair?) have enabled *Megalonyx jeffersonii* to occupy a greater latitudinal range than other North American ground sloths? The strong, broad tail —a stabilizer when reaching up —and curving front claws may have assisted the species to hook down high, leafy forage.

Of the two ground sloth families (Megalonychidae and Megatheriidae), the former first appeared in the early Oligocene (about 35 million years ago) of Patagonia, and the latter in the late Oligocene (some 30 million years ago) beds of South America. The latter group includes megatheres such as the heavily-built *Megatherium* and *Eremotherium*, reaching a length of 6 m; and the nothrotheres such as the slighter *Hapalops-Nothrotheriops* line, reaching a length of about 1.2 m. The earliest known North American megalonychid, *Pliometanastes protistus* that lived in Florida about 8 million years ago, shows no close relationship to *Megalonyx*. *Megalonyx*, a widespread North American genus, lived from the late Hemphillian (about 5 million years ago) to the close of the last (Wisconsinan) glaciation.

Megalonychids increased in size as time progressed. The first species were small and may have been partly arboreal (tree dwelling), whereas the Pliocene (about 5 to 2 million years ago) species were approximately half the size of the late Pleistocene *Megalonyx jeffersonii*. Some West Indian species ranged between cat-sized and black bear-sized-their dwarf condition reflecting their restricted island environment.

Several species of *Megalonyx* have been named; in fact it has been stated that "nearly every good specimen has been described as a different species". In some cases, even isolated teeth-a highly variable element in sloths-were diagnosed as the types (individual specimens considered characteristic of the group) of some species. A broader perspective on the group, accounting for age, sex, individual and geographic differences, indicates that only three species are valid *(M. leptostomus, M. wheatleyi, and M. jeffersonii)* in the late Pliocene and Pleistocene of North America. Probably the Blancan-Nebraskan (about 3 to 1.2 million years ago) narrow-mouthed ground sloth *Megalonyx leptostomus* was ancestral to Wheatley's ground sloth *(Megalonyx wheatleyi)* of Irvingtonian-Yarmouthian age (about 1.2 to 0.6 million years ago), which in turn gave rise to the larger, later *Megalonyx jeffersonii*.

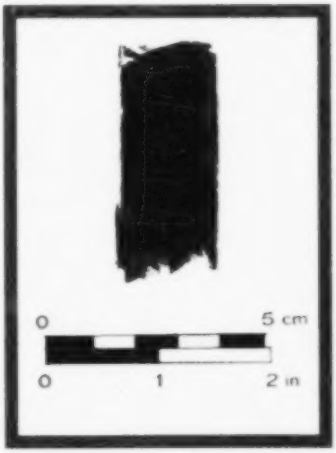

Figure 2: Upper Molar (side view). Old Crow, Y.T.

Jefferson's ground sloth first appears during the second last (Illinoian) glaciation (probably more than 150,000 years ago), and has been reported from about 80 localities including the eastern two-thirds of the United States (as well as the

coastal shelf off New Jersey) and parts of western North American (central Mexico to California to Washington and inland Idaho). *Megalonyx jeffersonii* is the only ground sloth that roamed as far north as the Yukon Territory and Alaska. In Canada, it is known from Saskatchewan, Alberta (Medicine Hat-perhaps of last [Sangamonian] interglacial age, about 130,000 years ago, and Edmonton), British Columbia (Quesnel Forks); Yukon (Old Crow River) and the Northwest Territories (Lower Carp Lake). Considered together, the Alaskan (Fairbanks area), Yukon and Northwest Territories records suggest that the species occupied a rather broad east-west range in northwestern North American during a warm phase of the late Pleistocene. Since the Old Crow specimens are smaller than most Wisconsinan (about 90,000 to 10,000 years ago) fossils, perhaps the species reached the region during the last interglacial.

In more southerly regions of North America, Jefferson's ground sloth lived in woodlands. Its broad, blunt caniniforms suggest a leaf-stripping adaptation, so *Megalonyx jeffersonii* probably browsed on leaves, twigs and perhaps nuts. There are no definite associations with people. Evidently *Megalonyx jeffersonii* became extinct about 9,400 years ago.

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July, 1993

Additional Reading

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